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DAIRY PRODUCTS AND DENTAL HEALTH

DR. JAMES H. SHAW
Associate Professor of Biological Chemistry
Harvard School of Dental Medicine
Boston, Massachusetts

Relatively little is known about the relationship of individual foods or groups of foods to tooth decay. Indeed, accurate evaluation of these relationships is fraught with untold problems of experimental design and execution. Foods may have a post-eruptive influence on tooth decay by reason of an effect on the oral environment after the teeth are fully formed and erupted. Or foods may have an influence during the development of the teeth through purely systemic influences that result in teeth with increased or decreased caries-resistance.

The Experimental Design

In human populations, careful evaluation of these post-eruptive and developmental relationships will be both time-consuming and difficult to control due to the chronic nature of the disease and prolonged developmental periods for the teeth. Carefully controlled laboratory experiments with caries-susceptible animals need to be used for preliminary evaluations of these relationships with the objective of further testing the most promising in adequately designed and executed clinical trials.

Two lengthy experiments involving 669 caries-susceptible rats in two generations have been conducted in our laboratories in which dairy products were compared for their influence on dental caries incidence during the post-eruptive period, and for any influence during tooth development to alter caries-resistance. The levels of foods chosen varied with age and approximated reasonable ranges for human consumption.

In the first experiment female rats were maintained from weaning through several reproductive cycles either on a cariogenic diet alone or with supplements of milk, chocolate drink or chocolate milk levels of 30, 30 or 35 percent of the caloric needs. Their off-spring were fed either the cariogenic diet exclusively throughout the experimental period or a dietary regimen beginning with the dairy product exclusively for the first six weeks and followed by the provision of 67 percent of the calories by the cariogenic diet and 33 percent by the dairy product for the remainder of the experimental period.

In the second experiment, female rats were fed mixtures of three dairy products throughout the reproductive cycles. A total of 45 percent of the caloric requirements were provided from the three dairy products: 30 percent from milk or chocolate milk, 10 percent from vanilla ice cream and 5 percent from cheddar cheese. The remainder of the calories were supplied by the cariogenic diet; the control females received the cariogenic diet exclusively. The offspring of these females received either the cariogenic diet or a dietary regimen beginning with the same mixtures of dairy products exclusively for the first 3 weeks and followed by a ration of 67 percent of the calories from the cariogenic diet and 33 percent from the dairy product. An additional group was maintained after the exclusively dairy product period in this experiment on a ratio of 75 percent of the calories from the cariogenic diet and 25 percent of the calories from the dairy product. Careful littermate comparisons were made in all the groups of these two experiments to guarantee an equivalent genetic influence.

Post-Eruptive Influence Seen

In all cases where the dairy products were fed from weaning throughout the post-eruptive experimental periods, major reductions in dental caries incidence were observed in comparison with the littermates which were fed only the cariogenic diet. These reductions were observed where only one dairy product was fed, or where the combination of milk or chocolate milk, vanilla ice cream and cheddar cheese was provided. Presumably these reductions occurred because the dairy

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foods were readily cleared from the oral cavity and did not adhere to caries-susceptible tooth surfaces, or else they influenced the oral environment beneficially in some other way.

No influence, beneficial or deleterious, was observed as a result of the provision of dairy products during the development of the teeth. The cariogenic diet that was used contained ample amounts of all known essential nutrients. Supplementation with dairy products could not be expected to provide essential nutrients more abundantly than the cariogenic diet. Current data are not available to indicate whether comparable supplementation of an inadequate or unbalanced diet with dairy foods would lead to different results.

Accurate prediction of the relationship of comparable levels of dairy product consumption among human populations to dental caries incidence cannot be made until comparable clinical trials are conducted. The striking reductions observed in these experiments in the post-eruptive period suggest the wisdom of further investigation of these interesting influences by well-designed and executed clinical trials.

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Glances AT NUTRITION RESEARCH

Research continues to supply information about the dental caries process and factors which affect it. Better understanding is needed for effective control of this serious public health problem.

Local action of fluorine—Evidence that fluorine may act at the tooth surface to protect against dental caries was obtained from study of 472 children 12-13 years of age. All children were instructed briefly on dental health, nutrition and sanitation. An 8 percent solution of stannous fluoride was applied once to erupted permanent teeth of half of the children. One year later, the children answered correctly 70-75 percent of the subject matter taught. The group who received the fluoride treatment had 20 percent fewer carious new teeth and 14.5 percent fewer new carious surfaces than the untreated group.

—Public Health Reports 73:1010 (Nov.) 1958.

Acidity of tooth cavities—An acid condition was found to exist in practically all cavities in mouths of 56 subjects, even many hours after food was consumed. Amount of acidity was not correlated with extent of caries. A 10 percent sugar solution increased acidity by 0.1 to 1.0 pH units in 5-10 minutes. Four solid foods and one liquid food raised pH by 0.1 to 1.6 pH units within the same time with only occasional acid formation 30 minutes after eating.

—J. Am. Dent. Assn. 57:685 (Nov.) 1958.

Lysine, minerals and caries—The dental caries created in rats by the feeding of heat-treated wheat cereal diets was reduced by supplementations of: lysine; milk ash; a combination of calcium carbonate plus sodium acid phosphate; and by sodium acid phosphate.

—J. Nut. 65:619 (Aug.) 1958.

Availability of milk calcium—The apparent absorption of dietary calcium was 62±8 percent and 70±8 percent of that consumed when 91 percent and 76 percent of the calcium, respectively, was supplied by milk. About 2 quarts of milk per day were consumed when milk provided 91 percent of the calcium. About 1 quart was consumed per day when milk provided 76 percent of the calcium. Eight healthy young men served as subjects for ten day balance studies for each of the test diets.

—J. Dairy Science 41:1224 (Sept.) 1958.

Dr. James D. Shaw

A Canadian by birth, a citizen of this country by naturalization, Dr. Shaw received his Ph.D. in biochemistry from the University of Wisconsin in 1943. He has contributed research on nutritional relationships to the development, calcification, metabolism, and disease susceptibility of oral structures.

In addition to a busy teaching and research schedule at the Harvard School of Dental Medicine, Dr. Shaw serves on the staff of the Forsyth Dental Infirmary for Children, Tufts College, Boston.

Among his many professional affiliations, Dr. Shaw serves as a member, and subcommittee chairman of the Committee on Dentistry, Medical Science Division of the National Research Council, National Academy of Sciences, Washington, D.C.

Century of Health Service

The 100th anniversary of the American Dental Association finds this group a world leader in dental education, dental science and in public health responsibility. Its 90,000 members are professional descendants of the 26 dentists who met at Niagara Falls, N.Y. on August 3, 1859 to establish the first dental organization.

This centennial year finds an average of more than seven out of each eight dentists as members of the Association, with each member pledged ". . . to encourage the improvement of the health of the public and to promote the art and science of dentistry."

We salute the American Dental Association and its members.

PLANNING SPURS COMMUNITY DENTAL HEALTH

By Betty Krippene, D.H., M.P.H., Wisconsin State Board of Health
District #3 Office, Fond du Lac, Wisconsin

The life of almost every person has been touched by dental disease. Many people have had more than just a casual contact with this wide-spread physical defect; they have felt its full impact with rampant dental decay, infection of the supporting tissues and premature loss of teeth.

Wisconsin, like other states, has its share of dental disease. However, with guidance from the State Board of Health, many communities have been resourceful in developing dental health programs which have shown favorable results.

In analyzing why these programs have been successful, we find there are some common elements. Primarily, these programs stem from the seeds of interest planted by a superintendent of schools, a public health nurse or a group such as the Parent-Teachers Association. Secondly, they have the active support of the local dental society and citizens who recognize their own dental health needs. A third element is a continuous evaluation process beginning with the basic fact-finding survey and including periodic replanning in light of experience and additional "know how."

What has been accomplished? When people have been willing to spell out program objectives and work together toward them, things have happened. About three-fourths of the Wisconsin population using public water supplies is drinking fluoridated water. In many of our counties where a voluntary dental examination program for school children is in effect, approximately 65 percent are under annual dental supervision. This we know through use of the dental referral card procedure which serves as a tool for evaluation as well as to remind children and parents of the importance of early and regular dental care.

The contribution of our public health dental hygienists in bridging the gap between theory and action is reflected in the high level of dental health in the municipalities where they're employed. Here statistics show that among children of school age about 75 percent of the permanent teeth attacked by dental decay have been filled.

In line with teaching good everyday food habits and dental health practices we have tried to promote healthful living within our school. Soft-drink vending machines have been practically eliminated. Also, progress has been made in establishing policies concerning the sale of confections and the serving of sweet foods as "treats."

Do we have problems? Of course we do. We're concerned about the neglected primary teeth and dental malformations which are handicapping many children. There are low income families who are unable to afford dental care and there are those who visit the dentist for emergency treatment only. We're aware, too, of the need to do something about the dental health of our citizens with long-term illness.

To attack these unsolved dental health problems, a new approach in our community programs may be indicated. This may involve a broader concept of dental disease and its influence on well-being, as well as better understanding of people's attitudes and values. It may be necessary to study the forces within the community that deter or evoke action toward improved dental health. Surely, there's a job ahead, so it's wise to have the forward look.

HEALTH COORDINATOR VIEWS SMILE CAMPAIGN

Mrs. Ida P. Meyers, Health Coordinator
North Miami High School, Miami, Florida

How do we interest teenagers in health activities? At North Miami Senior High School we let them interest themselves through various club activities, and the results are gratifying.

Early in the 1957 school year our Health Council surveyed the health needs of the student body. We found one of its major needs to be an improvement in eating habits. The Council decided this would be its major project for the year—a teenage nutrition project.

The Health Council is composed of faculty members, parents, and students. It was our student members who made the best suggestions for launching a nutrition campaign. They thought it important to the success of the program to enlist the cooperation of faculty, students and parents, and they recommended that we concentrate on food selection, good posture, and dental hygiene.

We decided to get our teenage nutrition program underway during January so as to encourage better daily attendance during the winter months. The activities for this program would include both class and club projects.

Subject area departmental meetings were held where teachers made plans for providing class instruction in nutritional needs and ways to satisfy these needs.

Club organizations volunteered their services too. The student council arranged for special assemblies, securing speakers and films. The Future Nurses' Club secured and displayed appropriate pictures, charts, and graphs. Their club members encouraged the eighty homerooms to enter a health poster contest.

The Key Club, a group of young boys showing promise of real leadership ability, requested and received permission to conduct the dental hygiene phase of the program during the last week of January. The activities chairman of the Key Club arranged through the Dairy Council of Dade, Broward and Monroe Counties for posters and visual aids to arouse the student body's interest in dental hygiene. On Monday, bulletin boards and display windows were filled with pictures and messages on how to improve one's smile.

Key Club members pinned big red S-M-I-L-E cards on each teacher Tuesday morning before classes. All during the day students questioned their teachers on why they were wearing the "smile" signs.

Wednesday morning found the Nor-Mi-Hi-Pioneer, our school newspaper, carrying a feature article explaining the Smile Campaign and the importance of dental hygiene. During the day four Key Club members carried giant toothbrushes and placards reminding

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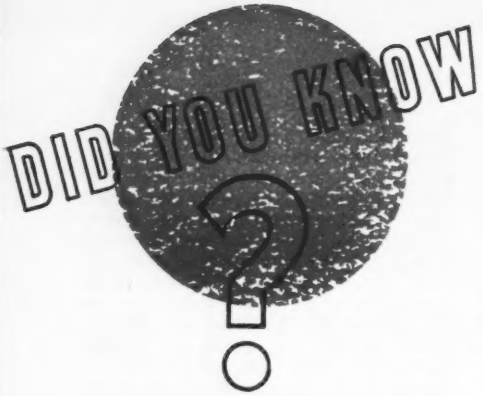

—that nutritionists estimate it would take a 9 percent increase in milk production if U.S. families had the recommended allowances in calcium, or a total of over 130 billion pounds of milk?

—that at present there are only enough dentists to take care of about 25 percent of our population?

—that salt-free butter and the cheeses, ricotta or mozzarella, made without salt, can add flavor to sodium-restricted diets?

—that fluorine is an essential element in the structure of decay-resistant teeth?

—that paper milk containers now carry more than 50 percent of the nation's fluid milk to market?

—that high altitude flying can result in a toothache to end all toothaches unless cavities are perfectly filled, since the reduced external pressure will exert force through the blood vessels that press on the tooth nerve, much like the "bends" caused by gases in the blood-stream in deep-sea diving?

—that almost 20 quarts of ice cream and other frozen dairy products were consumed per person in 1958?

—that two out of every three "working" toothbrushes in the U.S. are not fit for use?

THINGS YOU'LL LIKE TO READ

Your Child's Teeth—A Guide For Parents. Edgar S. Bacon. Dutton, New York. 1957. $2.50.

This book is a worthy companion to any of the standard texts on infant and child care. Format, content and style make it easy for use in the home and for dentists to use as a pattern for the dental health education of parents and children. Chapters cover: Teething, First Teeth, Home Care and Remedies, First Dental Appointment, Dental Care, Permanent Teeth, Nutrition, Mouth Habits, Injuries, Decay, Malocclusion and Orthodontics, Diseases and Health Programs.

Nutrition in Health and Disease—Lenna F. Cooper, Edith M. Barber, Helen S. Mitchell, and Henerika J. Rynbergen. J. P. Lippincott Company, Phila. 1958.

This 13th edition of a classic text gives the accepted nutrition principles and practices of today. Brought into line with the 1958 Recommended Dietary Allowances, the text is extensively revised. New material includes: Food and Public Health, The Patient and His Nutritional Problems. There are new charts and photographs throughout. General references are divided into professional and lay categories.

HEALTH COORDINATOR VIEWS SMILE CAMPAIGN

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students to brush their teeth at least twice a day.

By this time the entire student body was becoming interested in the smile project. On Thursday each student received his own S-M-I-L-E card in the homeroom. Students were encouraged to eat lunch that day in the cafeteria, where each plate lunch included a carton of milk.

Friday morning in a school assembly, the Key Club chairman introduced Dr. H. K. Terry, an orthodontist. More than nine hundred students listened attentively as he told them of the importance of a good diet and the need for regular dental care. His talk was made more effective through the use of films showing the development of man's jaw and teeth from the time of the cave men to the present.

He presented vivid illustrations of the way in which diet can affect tooth development and personal appearance.

To climax this week of dental health activities, Key Club members stood by the cafeteria cash register and presented a toothbrush to every twenty-fifth student who selected a plate lunch with milk. Eighty toothbrushes were distributed, which indicates that about two thousand students purchased plate lunches and milk that day.

As Health Coordinator, I believe that senior high students are always more interested in and participate more whole-heartedly in those activities which they themselves initiate and carry through. One Key Club member admitted that the project had made him aware of the personal importance of clean teeth. All the Club members agreed that the S-M-I-L-E campaign had been a worthwhile activity for them, and one which had provided a real service to the entire student body.